

1. A liquid crystal device comprising
a transparent front plate;
a back plate spaced apart from the transparent front plate;
a cholesteric liquid crystal material between said transparent front
5 plate and said back plate, said cholesteric liquid crystal material having a
reflective state wherein said cholesteric liquid crystal material reflects
light through said front plate, said light characterized by a first
wavelength in the absence of an applied electric field; and
means for applying an electric field to said cholesteric liquid
10 crystal material in the reflective state to cause said cholesteric liquid
crystal material to reflect light characterized by a second wavelength
different than said first wavelength.

2. The cholesteric liquid crystal device of claim 1 wherein the
15 cholesteric liquid crystal material in said reflective state comprises
molecules in a helical arrangement having a helical axis in a first
direction, and said means is adapted to apply an electric field in a
second direction nonparallel to the first direction.

20 3. The cholesteric liquid crystal device of claim 2 wherein the
cholesteric liquid crystal material in said reflective state is characterized
by a first pitch in the absence of an applied electric field and wherein
said means is adapted to apply an electric field effective to produce a
second pitch different from the first pitch.

4. A liquid crystal display device comprising
a transparent front plate;
a back plate spaced apart from said front plate;
a cholesteric liquid crystal layer between said transparent front
5 plate and said back plate, said cholesteric liquid crystal layer comprising
a cholesteric liquid crystal material switchable in response to an applied
electric field applied along a first direction between a transparent state
and a reflective state, said cholesteric liquid crystal material in said
reflective state being effective to reflect light characterized by a first
10 wavelength through the transparent front plate; and

means for applying an electric field to said cholesteric liquid
crystal material in a second direction distinct from to the first direction to
cause said cholesteric liquid crystal material in the reflective state to
reflect light characterized by a second wavelength different than said first
15 wavelength.

5. The liquid crystal display device of claim 4 wherein the second
direction is perpendicular to the first direction.

20 6. The liquid crystal display device of claim 4 wherein the first
direction is perpendicular to the transparent front plate.

7. The liquid crystal display device of claim 4 wherein the first
wavelength corresponds to light having a blue color.

8. A liquid crystal display comprising
a transparent front plate;
a back plate spaced apart from said front plate;
a cholesteric liquid crystal layer between said transparent front
5 plate and said back plate and having a region, said cholesteric liquid
crystal material comprising a cholesteric liquid crystal material
switchable between a transparent state and a reflective state wherein
said liquid crystal material reflects light having a first wavelength through
said front plate;

10 first electrodes adjacent said cholesteric liquid crystal material
layer at said region for applying a first electric field to switch said
cholesteric liquid crystal material between the transparent state and the
reflective state; and

15 second electrodes located adjacent said cholesteric liquid crystal
material about said region for applying a second electric field across said
region to cause said liquid crystal material at said region to reflect light at
a second wavelength different than said first wavelength.

9. The cholesteric liquid crystal display of claim 8 wherein said
20 first pair of electrodes apply the first electric field along a first direction
perpendicular to the transparent front plate, and
wherein the second pair of electrodes applies the second electric
field along a second direction perpendicular to the first direction

25 10. The cholesteric liquid crystal display device of claim 8
wherein the cholesteric liquid crystal material reflects blue light in the
reflective state in the absence of a second applied electric field.

30 11. The cholesteric liquid crystal display of claim 8 wherein the
second electric field is obtained by applying a voltage across the second
electrodes between about 5 to 500 volts.

12. A cholesteric liquid crystal display device comprising
a transparent front plate,
a back plate spaced apart from the transparent front plate,
5 a layer between the transparent front plate and the back plate and
comprising a plurality of pixels, each said pixel comprising a first
subpixel and a second subpixel adjacent the first subpixel, said layer
composed of a cholesteric liquid crystal material switchable between a
transparent state and reflective state, wherein said cholesteric liquid
10 crystal material in said reflective state reflects light at a first wavelength
in the absence of an applied electric field,
first electrodes at said first subpixel for applying a first electric
field in a first direction to switch said cholesteric liquid crystal material at
said first subpixel between the transparent state and the reflective state,
15 means for applying a second electrical field at the first subpixel in
a second direction different from the first direction to cause said
cholesteric liquid crystal material at said first subpixel to reflect light at a
second wavelength different from the first wavelength, and
electrodes at said second subpixel for applying an electric field to
20 switch said cholesteric liquid crystal material between said transparent
state and said reflective state, such that said electrodes at said second
subpixel switch said cholesteric liquid crystal at said second subpixel
independent from the first subpixel.

13. The cholesteric liquid crystal displaying device of claim 12 wherein said means for applying a second electric field at the first subpixel comprises a pair of electrodes distinct from the electrodes for applying the first electric field.

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14. The cholesteric liquid crystal display device of claim 12 wherein said second subpixel reflects light of a first color and wherein said first subpixel reflects light of a second color distinct from the first color, and wherein the light from the first subpixel and the second subpixel combine such that light from the pixel is perceived to be a third color.

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15. A method for operating a cholesteric liquid crystal device comprising a cholesteric liquid crystal material, said method comprising applying a first electric field in a first direction to the cholesteric liquid crystal material to switch the cholesteric liquid crystal material 5 between a transparent state and a reflective state, wherein the cholesteric liquid crystal material in said reflective state reflects light characterized by a first wavelength in the absence of an applied electric field, and

10 applying a second electric field in a second direction to the cholesteric liquid crystal material in the reflective state to cause said cholesteric liquid crystal material to reflect light characterized by a second wavelength distinct from the first wavelength.

15. 16. The method of claim 15 wherein the second electric field is obtained by applying a voltage across the second electrodes between about 5 to 500 volts.

20 17. The method of claim 15 wherein the first wavelength corresponds to a blue color and wherein the second wavelength is greater than the first wavelength to correspond to a color with the green or red ranges.

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